

ABSTRACT

Nanoparticles containing retinoic acid have reduced irritancy of retinoic acid and are suitable for subcutaneous or intravenous administration, as well as for use in sustained-release preparation. The high skin permeability of the nanoparticles makes them suitable for use in pharmaceutical or non-pharmaceutical external preparations or cosmetics intended for skin application. The present invention provides a method for adjusting the particle size of such nanoparticles and nanoparticles produced by such a method. Specifically, the method involves dispersing retinoic acid dissolved in a lower alcohol in an aqueous alkali solution; adding a nonionic surfactant to the dispersion to form a mixed micelle; adding to the micelle a halide or acetate of divalent metal along with a carbonate or phosphate of alkali metal so that the molar ratio of the former to the latter is 1:0 to 1:1.0, thereby depositing a coating of inorganic salt of polyvalent metal on the surface of the micelle; and adjusting the average particle size of the resulting nanoparticles to 5 to 300 nm. The inorganic salt of polyvalent metal may be calcium carbonate, zinc carbonate, or calcium phosphate.